

REMARKS

Claims 27 and 32-35 are pending in this application. Claim 27 has been amended. No new matter has been introduced.

Claims 27 and 32-35 stand rejected under 35 U.S.C. § 112, first paragraph, as containing the recitation “a second gate stack . . . including a conductive layer of p-type conductivity.” (Office Action at 3-4). The drawings stand objected to under 37 CFR § 1.83(a) as “the gate stack including a p-type conductivity layer in a partially depleted SOI NMOS transistor must be shown or the feature(s) canceled.” (Office Action at 2). Claim 27 has been amended to correct the typographical error and to recite “a second gate stack . . . including a conductive layer of n-type conductivity.” Withdrawal of the claim rejection and the drawing objection is respectfully requested.

Claims 27 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yu (U.S. Patent No. 6,484,065) in view of Houston (U.S. Patent No. 6,424,016). This rejection is respectfully traversed.

Amended independent claim 27 recites a “processor-based system” comprising “a processor” and “an integrated circuit coupled to said processor, at least one of said integrated circuit and processor comprising a fully-depleted SOI NMOS transistor as part of a memory array, said fully-depleted SOI NMOS transistor comprising first source and drain regions provided on a SOI substrate, said first source and drain regions being of n-type conductivity” and “a first gate stack fabricated on said SOI substrate, said first gate stack including a doped silicon/germanium layer of p-type conductivity.” Amended independent claim 27 also recites “a partially-depleted SOI NMOS transistor as part of a periphery array, said partially-depleted SOI NMOS transistor comprising second source and drain regions provided on said SOI substrate,

said second source and drain regions being of n-type conductivity” and “a second gate stack fabricated on said SOI substrate, said second gate stack including a conductive layer of n-type conductivity.”

Yu relates to “digital signal processing (DSP).” Yu teaches that “efficient DSP or MPU is combined with efficient DRAM on a single IC die.” (Abstract). According to Yu, “[t]o optimize the embedded memory, the chip includes wide-band connections to DRAM” so that “[r]ow and column addresses of DRAM can be applied at the same time using wide address busses.” (Abstract).

Houston relates to a DRAM having a SOI substrate with the same conductivity type transistors in the periphery and array area. According to Houston, the DRAM includes “a memory array including a plurality of pass gate transistors and a plurality of memory elements.” (Abstract). Houston also teaches that “[t]he pass gate transistors include a gate material selected to provide a substantially near mid-gap work function or greater.” (Abstract).

The subject matter of claims 27 and 32 would not have been obvious over Yu and Houston, whether considered alone or in combination. Specifically, the Office Action fails to establish a *prima facie* case of obviousness. Courts have generally recognized that a showing of a *prima facie* case of obviousness necessitates three requirements: (i) some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine the reference teachings; (ii) a reasonable expectation of success; and (iii) the prior art references must teach or suggest all claim limitations. See e.g., In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Rouffet, 149 F.3d 1350, 1355 (Fed. Cir. 1998); Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573 (Fed. Cir. 1996).

First, Yu and Houston, whether considered alone or in combination, fail to disclose, teach or suggest all limitations of claim 27. Yu is silent about "at least one of said integrated circuit and processor" comprising "a fully-depleted SOI NMOS transistor as part of a memory array" and "a partially-depleted SOI NMOS transistor as part of a periphery array," as amended independent claim 27 recites. Yu does not even mention a "SOI substrate," much less a "SOI substrate" on which fully-depleted and partially-depleted transistors having the specific characteristics recited in claim 27 are formed in the memory and array areas, respectively.

Houston also does not disclose, teach or suggest "a processor," much less "an integrated circuit coupled to said processor," wherein at least one of said integrated circuit and processor comprises SOI NMOS transistors, as in the claimed invention. Houston is also silent about "a fully-depleted SOI NMOS transistor as part of a memory array . . . comprising first source and drain regions . . . of n-type conductivity; and a first gate stack . . . including a doped silicon/germanium layer of p-type conductivity" and "a partially-depleted SOI NMOS transistor as part of a periphery array . . . comprising second source and drain regions . . . of n-type conductivity; and a second gate stack . . . including a conductive layer of n-type conductivity," as in the claimed invention. Houston teaches only that p+polysilicon gate material is employed for "(1) Pass transistors: fully depleted p-channel transistors having n-doped poly gates with $1E17$ n type doping in channel. (V_t =about.-1.2V)" and "(3) p-channel periphery transistors: partially depleted transistors having p-doped poly gates with $6E17$ n type doping in channel. (V_t =about.-0.5V)." (Col. 6, lines 15-24). Thus, Houston is silent about the characteristics of the fully-depleted and partially-depleted SOI NMOS transistors of the claimed invention.

Applicants note that, in the June 10, 2005 Office Action, the Examiner noted that "Houston clearly shows an FD NMOS transistor 41 in a memory array region . . . comprising n-type source/drain regions and a p-type gate" as well as "a PD transistor 42 in an array region . . . comprising n-type source/drain regions and a p-type gate." (Office Action at 8). Applicants disagree. Nowhere in the reference is Houston clearly showing a FD NMOS transistor in the array region having a p-type gate and a PD NMOS transistor in the periphery region having an n-type gate. FD NMOS transistor 41 of Houston is indeed shown in Figure 5 and indeed could be an n-channel transistor (Col. 4, lines 55-57). However, Houston does not disclose that the FD NMOS transistor 41 is an n-channel transistor and has a p-type gate and is further provided adjacent a PD NMOS transistor in the periphery region having an n-type gate.

The Examiner refers to the PD transistor 42 of Houston located in the periphery region and incorrectly asserts that "[it] compris[es] n-type source/drain regions and a p-type gate" (col. 5/ll. 51, 54-56 and col. 6/ll. 709). (Office Action at 8). Applicants note that column 5, lines 51 and 54-56, of Houston only teaches that a p-type gate can be part of a p-channel or n-channel periphery transistor, and not that an n-type gate can be part of an n-channel periphery transistor, as in the claimed invention.

Houston also does not disclose, teach or suggest "a first gate stack . . . including a doped silicon/germanium layer of p-type conductivity" as part of a "fully-depleted SOI NMOS transistor . . . of a memory array," much less "a first gate stack . . . including a doped silicon/germanium layer of p-type conductivity" as part of a "fully-depleted SOI NMOS transistor . . . of a memory array" and further as part of a "processor-based system" comprising "a processor" and "an integrated circuit coupled to said processor," as in the claimed invention

Second, to establish a *prima facie* case of obviousness, “[i]t is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor.” Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990). This way, “the inquiry is not whether each element existed in the prior art, but whether the prior art made obvious the invention as a whole for which patentability is claimed.” Hartness Int’l, Inc. v. Simplimatic Engineering Co., 819 F.2d 1100, 1108 (Fed. Cir. 1987). Accordingly, a determination of obviousness “must involve more than indiscriminately combining prior art; a motivation or suggestion to combine must exist.” Pro-Mold & Tool Co., 75 F.3d at 1573. This way, a rejection of a claim for obviousness in view of a combination of prior art references must be based on a showing of a suggestion, teaching, or motivation that has to be “clear and particular.” In re Dembiczak, 175 F.3d at 999. Thus, the mere fact that it is possible to find two isolated disclosures which might be combined to produce a new structure does not necessarily render such process obvious, unless the prior art also suggests the desirability of the proposed combination.

The June 10, 2005 Office Action fails to establish a *prima facie* case of obviousness because, as the Court in Northern Telecom, Inc. noted, “[i]t is insufficient that the prior art disclosed the components of the patented device” and there is no “teaching, suggestion, or incentive to make the combination.” Northern Telecom, Inc., 908 F.2d at 934. On one hand, the crux of Yu is optimizing an embedded memory by providing the chip with wide-band connections to DRAM, so that “[r]ow and column addresses of DRAM can be applied at the same time using wide address busses.” (Abstract). On the other hand, the crux of Houston is a DRAM having a SOI substrate with the same conductivity type transistors in the periphery and array area. For this, Houston teaches that pass gate transistors are selected to “include a gate material

selected to provide a substantially near mid-gap work function or greater.” (Abstract). Accordingly, a person of ordinary skill in the art would not have been motivated to combine these two disparate references, and withdrawal of the rejection of claims 27 and 32 is respectfully requested.

Claim 33 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Yu/Houston in view of Krivokapic (U.S. Patent No. 6,452,229). Claims 34 and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yu/Houston in view of Wu. These rejections are respectfully traversed. Applicants note that the combined references, alone or in combination, fail to disclose, teach or suggest all limitations of amended independent claim 27. For at least the reasons above with respect to the allowance of claim 27, withdrawal of the rejections of dependent claims 33-35 is also respectfully requested.

In addition, Applicants note that the rejection of claim 33 is predicated on the Krivokapic (U.S. Patent No. 6,452,229) reference. Under 35 U.S.C. § 102(e), the effective date of the Krivokapic reference is February 21, 2002. However, the subject matter of claim 33 was conceived prior to this date and was diligently pursued from prior to the reference date toward a constructive reduction to practice, which occurred on the June 5, 2002 filing of the present application. A Rule 131 Declaration from one of the inventors attesting to this is attached. The Declaration establishes a “prior invention” with respect to the effective date of the Krivokapic reference (i.e., February 21, 2002). That is, the Declaration establishes conception of the claimed invention prior to the effective date of the Krivokapic reference (i.e., prior to February 21, 2002) coupled with due diligence from prior to the reference date to the filing date of the present application (i.e., June 5, 2002). *See* M.P.E.P. § 715.07. “A rejection based on 35 U.S.C. 102(e) can be overcome by . . . [f]iling an affidavit or declaration under 37 CFR 1.131

showing prior invention." M.P.E.P § 706.02(b). Accordingly, Krivokapic is not a proper reference and the rejection of claim 33 based thereon must be withdrawn.

Allowance of all pending claims is solicited.

Dated: December 12, 2005

Respectfully submitted,

By 

Thomas J. D'Amico

Registration No.: 28,371

Gabriela I. Coman

Registration No.: 50,515

DICKSTEIN SHAPIRO MORIN &

OSHINSKY LLP

2101 L Street NW

Washington, DC 20037-1526

(202) 785-9700

Attorneys for Applicants